

Having described the invention, what is claimed as new and to be secured by Letters Patent is:

1. An optical fiber, comprising:
a core comprising an outer region disposed about an inner region, the inner region comprising a first index of refraction and the outer region comprising a second index of refraction that is greater than the first index of refraction;
a cladding disposed about the core;
the fiber further comprising a fundamental mode having an intensity profile at a first wavelength wherein the highest intensity of the intensity profile is no greater than 75% of the highest intensity of a Gaussian intensity profile normalized so as to have the same power as the intensity profile; and
wherein the outer region of the core comprises a first concentration of a selected rare earth and wherein any concentration of the selected rare earth comprised by the inner region is less than the first concentration.
2. The optical fiber of claim 1 wherein the highest intensity is no greater than 60% of the highest intensity of the Gaussian intensity profile.
3. The optical fiber of claim 1 wherein the inner region is substantially free of the selected rare earth.
4. The optical fiber claim 1 wherein the selected rare earth comprises erbium.
5. The optical fiber of claim 4 wherein the outer region comprises ytterbium.
6. The optical fiber of claim 1 wherein the highest intensity of the intensity profile is no greater than 50% of the highest intensity of the Gaussian intensity profile.

7. The optical fiber of claim 1 wherein the inner region is photosensitive, and the outer region, if photosensitive at all, has less than 50% of the photosensitivity of the inner region.
8. The optical fiber of claim 1 wherein the inner region is photosensitive, and the outer region, if photosensitive at all, has less than 10% of the photosensitivity of the inner region.
9. The optical fiber of claim 1 wherein the inner region comprises a selected concentration in weight percent of a selected photosensitive material, and wherein any concentration of the selected photosensitive material comprised by the outer region is less than the selected concentration.
10. The optical fiber of claim 1 wherein the inner region comprises a selected concentration in weight percent of a selected photosensitive material, and where any concentration of the selected photosensitive material comprised by the outer region is not greater than 50% of the selected concentration.
11. The optical fiber of claim 1 including a second cladding disposed about the cladding such that the cladding can guide light.
12. The optical fiber of claim 11 wherein the fiber is birefringent and extends along a longitudinal axis, the fiber comprising at least one longitudinally extending region for inducing stress.
13. The optical fiber of claim 11 wherein the second cladding is microstructured.
14. The optical fiber of claim 11 wherein the second cladding comprises longitudinally extending voids.

15. The optical fiber of claim 1 wherein the fiber is birefringent and extends along a longitudinal axis, the fiber comprising at least one longitudinally extending region for inducing stress.

16. An optical fiber, comprising: ✓

a core comprising an outer region disposed about an inner region, the inner region comprising a first index of refraction and the outer region comprising a second index of refraction that is greater than the first index of refraction;

a cladding disposed about the core;

the fiber further comprising a fundamental mode having an intensity profile at a first wavelength wherein the highest intensity of the intensity profile is no greater than 75% of the highest intensity of a Gaussian intensity profile normalized so as to have the same power as the intensity profile; and

wherein the outer region of the core is photosensitive and the inner region comprises a first rare earth and a second rare earth that is different than the first rare earth, and the inner region, if photosensitive at all, has no greater than 50% of the photosensitivity of the outer region.

17. The optical fiber of claim 16 wherein the outer region comprises a concentration of GeO_2 .

18. The optical fiber of claim 17 wherein the outer region comprises at least one of a concentration of B_2O_3 and a concentration of fluorine.

19. The optical fiber of claim 16 wherein the inner region comprises erbium and ytterbium.

20. The optical fiber of claim 16 wherein the inner region, if photosensitive at all, has no greater than 25% of the photosensitivity of the outer region.

21. The optical fiber of claim 16 wherein any concentration comprised by the outer region of one of the first and second rare earths is substantially less than the concentration of the one of the first and second rare earths comprised by the inner region.
22. The optical fiber of claim 16 wherein the inner region, if photosensitive at all, has no more than 10% of the photosensitivity of the outer region.
23. The optical fiber of claim 16 wherein the outer region is substantially free of any rare earth.
24. The optical fiber of claim 16 including a second cladding disposed about the cladding such that the cladding can guide light.
25. The optical fiber of claim 24 wherein the fiber is birefringent and extends along a longitudinal axis, the fiber comprising at least one longitudinally extending region for inducing stress.
26. The optical fiber of claim 24 wherein the second cladding is microstructured.
27. The optical fiber of claim 24 wherein the second cladding comprises longitudinally extending voids.
28. The optical fiber of claim 16 wherein the fiber is birefringent and extends along a longitudinal axis, the fiber comprising at least one longitudinally extending region for inducing stress.

29. An optical fiber comprising:
a core extending along a longitudinal axis;
a cladding disposed about the core;
a refractive index profile comprising outer sections disposed about an inner section comprising a first index of refraction, the outer sections each having an index of refraction that is greater than the first index of refraction such that the optical fiber comprises at a first wavelength a fundamental mode having an intensity profile having a highest intensity that is no greater than 75% of the highest intensity of a Gaussian intensity profile normalized to have the same power as the intensity profile; and
wherein the fiber has a birefringence of at least 1×10^{-4} at wavelength of 633 nm.
30. The optical fiber of claim 29 wherein the cladding has a thermal coefficient of expansion (TCE), and wherein the fiber includes at least one longitudinally extending region having a TCE that is different than the TCE comprised by the cladding, the region for inducing stress for creating birefringence.
31. The optical fiber of claim 29 comprising a second cladding disposed about the cladding such that the cladding can guide light.
32. The optical fiber of claim 31 wherein the second cladding comprises a plurality of features having an index of refraction different than the index of refraction of the material of the second cladding disposed about the features.
33. The optical fiber of claim 32 wherein the features comprise voids.

34. An optical fiber comprising:
a core comprising an outer region disposed about an inner region;
a cladding disposed about the core;
the fiber comprising a fundamental mode having an intensity profile that has a reduced highest intensity relative to a Gaussian intensity normalized to have the same power as the intensity profile; and
wherein one of the inner and outer regions of the core comprises a first concentration of a selected rare earth and the other of the regions comprises a second concentration of a selected photosensitive material, any concentration of the selected rare earth comprised by the other region being less than the first concentration and any concentration of the selected photosensitive material comprised by the one region being less than the second concentration, and wherein when the selected photosensitive material comprises GeO_2 and the outer region comprises the second concentration of the selected photosensitive material, the second concentration is greater than 5 weight percent.
35. The optical fiber of claim 34 wherein the outer region comprises the second concentration of the selected photosensitive material.
36. The optical fiber of claim 35 wherein the outer region is substantially free of the selected rare earth.
37. The optical fiber of claim 34 wherein the inner region is substantially free of the selected photosensitive material.
38. The optical fiber of claim 37 wherein the outer region is substantially free of the selected rare earth.
39. The optical fiber of claim 34 wherein the outer region comprises the first concentration of the selected rare earth.

40. The optical fiber of claim 39 wherein the outer region is substantially free of the selected photosensitive material.

41. The optical fiber of claim 34 wherein the inner region is substantially free of the selected rare earth.

42. The optical fiber of claim 41 wherein the outer region is substantially free of the selected photosensitive material.

43. The optical fiber of claim 34 wherein the highest intensity of the intensity profile is no greater than 75% of the highest intensity of the normalized Gaussian intensity profile.